



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/683,374	12/19/2001	John C. Chappell	3383.1	7705
22886	7590	09/15/2005	EXAMINER	
AFFYMETRIX, INC			FORMAN, BETTY J	
ATTN: CHIEF IP COUNSEL, LEGAL DEPT.			ART UNIT	
3380 CENTRAL EXPRESSWAY			PAPER NUMBER	
SANTA CLARA, CA 95051			1634	

DATE MAILED: 09/15/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/683,374

Applicant(s)

CHAPPELL, JOHN C.

Examiner

BJ Forman

Art Unit

1634

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 July 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 and 53-56 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 and 53-56 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

FINAL ACTION

Status of the Claims

1. This action is in response to papers filed 5 July 2005 in which claims 1, 2, 4-8, 12-14 and 53 were amended, claims 15-52 were canceled and claims 55-56 were added. All of the amendments have been thoroughly reviewed and entered.

The previous rejections in the Office Action dated 4 March 2005, not reiterated below, are withdrawn in view of the amendments. Applicant's arguments have been thoroughly reviewed and are discussed below as they apply to the instant grounds for rejection. New grounds for rejection, necessitated by amendment, are discussed.

Claims 1-14 and 53-56 are under prosecution.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-7, 13 and 53 are rejected under 35 U.S.C. 102(a) as being anticipated by Braun et al (WO 00/69553, published 23 November 2000). The passages of Braun cited below are from the English language translation i.e. U.S. Patent No. 6,819,843.

Art Unit: 1634

Regarding Claim 1, Braun et al disclose a method for synthesizing a nucleic acid probe array comprising providing a substrate, providing photo-protected nucleotides, directing light onto a plurality of optical fibers wherein each fiber operably couples to an interface (e.g. mask) that aligns an end of the fiber with a synthesis area on the substrate (Column 5, lines 35-47), selectively switching the elements between light-passing and non-passing in response to gating data whereby a set of fibers is in the light-passing state (i.e. controlled exposure pattern, Column 4, line 58-Column 5, line 57), disposing light thorough the set of optical fibers onto each aligned area of the substrate to provide a reactive group and contacting the nucleotides with the reactive group (Column 3, line 57-Column 4, line 38 and Claim 17).

Regarding Claim 2, Braun et al disclose the method wherein light passed though at least one fiber in the light-passing state to strike each aligned area of the substrate thereby activating the area i.e. grid point (Column 3, line 63-Column 4, line 8 and Column 5, lines 2-9).

Regarding Claim 3, Braun et al disclose the method wherein the light includes ultraviolet (Column 3, lines 23-34).

Regarding Claim 4, Braun et al disclose the method wherein the plurality of optical fiber elements comprises an optical fiber (a bundle of optical fibers, Column 3, lines 25-27).

Regarding Claim 5, Braun et al disclose a method for aligning optical fibers with a area for probe synthesis on a substrate comprising, directing light onto a plurality of optical fibers wherein each fiber operably couples to an interface (e.g. mask) that aligns an end of the fiber with a synthesis area on the substrate (Column 5, lines 35-47), selectively switching the optical fibers between light-passing and non-passing in response to gating data (i.e. controlled exposure pattern, Column 4, line 58-Column 5, line 57) and disposing light thorough optical fibers onto the substrate (Column 3, line 57-Column 4, line 38 and Claim 17).

Regarding Claim 6, Braun et al disclose the method further comprising activating each aligned area of the substrate (Column 3, line 62-Column 4, line 8 and Column 5, lines 2-9).

Art Unit: 1634

Regarding Claim 7, Braun et al disclose the method wherein light passed through each fiber strikes an aligned area thereby activating the area (Column 3, line 63-Column 4, line 8 and Column 5, lines 2-9).

Regarding Claim 13, Braun et al disclose the method further comprising deactivating the areas (i.e. light to the selected portion is turned off, masked or blocked, and building blocks for chain elongation are added, Column 3, lines 62-67 and Column 4, line 58-Column 5, line 57).

Regarding Claim 53, Braun et al disclose the array made by the method of Claim 5 (Column 3, line 63-Column 4, line 8).

Response to Arguments

4. Applicant argues that Braun et al do not teach operatively coupling each end of the optical fiber with an interface that provides alignment of each fiber to the substrate. The argument has been considered but is not found persuasive because as cited above, Braun et al specifically teach alignment of the fibers and substrate via "dynamic mask" for controlling and targeting light from each fiber to the substrate (Column 3, lines 58-61 and Column 5, lines 35-47). Therefore, Braun et al teach an interface "operably coupled" to each fiber that aligns the light from the fiber onto the substrate.

Applicant asserts that Braun et al teach away from arranged fibers because they teach an unarranged and alternative embodiment. The passage has been noted. However, the passage immediately preceding the cited passage describes specific arrangements and bundling of the fibers. The passage further states "geometrical packing represents the most essential advantage of the invention." (Column 5, lines 51-57). Therefore, in contrast to Applicant's assertion, Braun et al is very interested in fiber arrangement.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 8-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Braun et al (WO 00/69553, published 23 November 2000) in view of Adams et al (U.S. Patent No. 6,156,494, filed 28 October 1997).

Regarding Claim 8, Braun et al disclose a method for synthesizing a nucleic acid probe array comprising providing a substrate, providing photo-protected nucleotides, directing light onto a plurality of optical fibers wherein each fiber operably couples to an interface (e.g. mask) that aligns an end of the fiber with a synthesis area on the substrate (Column 5, lines 35-47), selectively switching the elements between light-passing and non-passing in response to gating data whereby a set of fibers is in the light-passing state (i.e. controlled exposure pattern, Column 4, line 58-Column 5, line 57), disposing light thorough the set of optical fibers onto each aligned area of the substrate to provide a reactive group and contacting the nucleotides with the reactive group (Column 3, line 57-Column 4, line 38 and Claim 17).

Braun et al teach the method wherein reagents, including nucleic acid building blocks for chain elongation, are added to the support (Column 3, line 62-column 4, line 8) and they define the building blocks as monomers bearing functional groups (Column 1, lines 59-67) but they are silent regarding providing linkers on the substrate. However, linkers were well known in the art of nucleic acid synthesis as taught by Adams et al (Column 6, lines 31-39). Adams teaches a similar method arrays comprising, directing light onto one or more optical transfer elements, selectively switching the elements between light-passing and non-passing

Art Unit: 1634

and disposing light thorough optical transfer element onto the substrate (Column 5, lines 13-48 and Claims 1 and 27-29) wherein linkers are means for functionalizing the support for nucleic acid attachment (Column 6, lines 13-41). It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the support of Braun et al with the linkers taught by Adams et al for the expected benefit of providing a means for nucleic acid attachment as taught by Adams et al (Column 6, lines 13-48).

Regarding Claim 9, Braun et al teach the method wherein reagents, including nucleic acid building blocks for chain elongation, are added to the support (Column 3, line 62-column 4, line 8) and they define the building blocks as monomers bearing functional groups (Column 1, lines 59-67).

Regarding Claim 10, Braun et al teach the method wherein chain-elongating building blocks are added and they define the building blocks for nucleic acid synthesis include nucleotides (Column 1, lines 59-67).

Regarding Claim 11, Braun et al teach the method wherein the monomers include photoremovable protective groups i.e. "a light source emits a spectrum of wavelengths that can effect the deprotection of the nucleotides" (Column 3, lines 62-67). And Adams et al disclose the method wherein the monomer includes a photo-removable protecting group (e.g. Column 12, lines 12-26).

Regarding Claim 12, Braun et al teach the method further comprising selectively switching the elements between light-passing and non-passing in response to gating data whereby a set of fibers is in the light-passing state (i.e. controlled exposure pattern, Column 4, line 58-Column 5, line 57) and adding chain-elongating building blocks (Column 3, line 62-column 4, line 8) and they define the building blocks as monomers bearing functional groups (Column 1, lines 59-67). And Adams et al disclose the method wherein light passed though at least one optical transfer element strikes a second set of selected portions thereby activating the portions and contacting with a second monomer (Column 5, lines 13-48 and Claims 27-29).

Art Unit: 1634

Regarding Claim 13, Braun et al disclose the method further comprising deactivating the areas (i.e. light to the selected portion is turned off, masked or blocked, and building blocks for chain elongation are added, Column 3, lines 62-67 and Column 4, line 58-Column 5, line 57). And Adams et al disclose the method further comprising deactivating selected portions (i.e. at step (d) light activations forms a covalent bond between the first immobilized component and second component, Claim 1, step (d)).

Regarding Claim 14, Adams et al disclose the method wherein light passed through the transfer element, strikes a portion to deactivate the portion (i.e. at step (d) light activations forms a covalent bond between the first immobilized component and second component, Claim 1, step (d)).

7. Claims 55-56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Braun et al (WO 00/69553, published 23 November 2000) in view of Oshida et al (U.S. Patent No. 5,302,999, issued 12 April 1994).

Regarding Claims 55-56, Braun et al disclose a method for aligning optical fibers with a area for probe synthesis on a substrate comprising, directing light onto a plurality of optical fibers wherein each fiber operably couples to an interface (e.g. mask) that aligns an end of the fiber with a synthesis area on the substrate (Column 5, lines 35-47), selectively switching the optical fibers between light-passing and non-passing in response to gating data (i.e. controlled exposure pattern, Column 4, line 58-Column 5, line 57) and disposing light thorough optical fibers onto the substrate (Column 3, line 57-Column 4, line 38 and Claim 17).

Braun et al further teach the importance of specific arrangements and bundling of the fibers "geometrical packing represents the most essential advantage of the invention." (Column 5, lines 51-57) but they are silent regarding an interface comprising wells having walls operatively coupled with the tapered ends of the fibers. However, optical fibers coupled to an

Art Unit: 1634

interface having tapered wells complementary to tapered fibers was known in the art at the time the claimed invention was made as taught by Oshida et al (Fig. 2 and 11). Oshida et al teach a method of aligning optical fibers wherein the fibers are bundled within a mechanism (#10) to provide desired positioning of fibers within the bundle resulting light being directing as desired (Column 10, lines 35-40 and Column 12, lines 25-37). To provide the desired bundle, the fibers are arranged in a welled structure complementary to tapered fibers whereby a desired divergent angle of light is provided without the use of lens (Column 12, lines 25-37 and Fig. 11). It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to apply the welled structure of Oshida et al to the geometrically packaged fibers of Braun et al. One of ordinary skill in the art would have been motivated to do so with a reasonable expectation of success for the expected benefit of providing the desired divergent angle of light without the use of lens as taught by Oshida et al (Column 12, lines 25-37 and Fig. 11).

8. Claim 54 is rejected under 35 U.S.C. 103(a) as being unpatentable over Braun et al (WO 00/69553, published 23 November 2000) in view of Schembri et al (U.S. Patent No. 6,518, 056, filed 27 April 1999).

Regarding Claim 54, Braun et al teach the array made by the method of Claim 5 (Column 3, line 57-Column 4, line 38 and Claim 17) but they do not teach using customer-specific data to produce the arrays. However, custom-made arrays made according to customer specified data was well known in the art at the time the claimed invention was made as taught by Schembri et al who specifically teach this facilitates "experiment on demand" research (Column 15, lines 52-63). It would have been obvious to one of ordinary skill in the art at the

Art Unit: 1634

time the claimed invention was made to apply the customer data taught by Schembri et al to the arrays of Adams et al for the economy of experiment-specific array production and facilitation of manufacturing as taught by Schembri et al (Column 15, lines 33-35 and 52-63).

Response to Arguments

9. Applicant asserts that Schembri does not teach the processing steps of Claim 54. The argument has been considered but is not found persuasive. Claim 54 is drawn to the arrays of Claim 53 and further defines process steps of making the arrays. The process steps of Claim 54 merely define one structural element of the array i.e. that data is used to produce at least on probes sequence on the array (step 4). The step does not define the sequence or any other sequence or any other structural element of the array. Furthermore, the remaining steps do not define or limit the structural components of the array. Schembri teaches customer data is used to produce the array (Column 15, lines 55-57). Hence, Schembri teaches the single element missing from the array of Braun et al.

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Art Unit: 1634

Conclusion

11. No claim is allowed.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to BJ Forman whose telephone number is (571) 272-0741. The examiner can normally be reached on 6:00 TO 3:30.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gary Jones can be reached on (571) 272-0745. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to (571) 272-0547.

Patent applicants with problems or questions regarding electronic images that can be viewed in the Patent Application Information Retrieval system (PAIR) can now contact the USPTO's Patent Electronic Business Center (Patent EBC) for assistance. Representatives are available to answer your questions daily from 6 am to midnight (EST). The toll free number is (866) 217-9197. When calling please have your application serial or patent number, the type of document you are having an image problem with, the number of pages and the specific nature of the problem. The Patent Electronic Business Center will notify applicants of the resolution of the problem within 5-7 business days. Applicants can also check PAIR to confirm that the problem has been corrected. The USPTO's Patent Electronic Business Center is a complete service center supporting all patent business on the Internet. The USPTO's PAIR system provides Internet-based access to patent application status and history information. It also enables applicants to view the scanned images of their own application file folder(s) as well as general patent information available to the public.

For all other customer support, please call the USPTO Call Center (UCC) at 800-786-9199.


BJ Forman, Ph.D.
Primary Examiner
Art Unit: 1634
September 13, 2005